

The greatest inversion was recorded during the great frost of February, 1895, when at 9 a.m. on February 19 the summit was $17^{\circ}.6$ warmer than the base (Ben Nevis $33^{\circ}.6$, Fort William $16^{\circ}.0$). The longest continued inversion occurred during November 2-5, 1897, when the summit temperature was the higher for fifty-eight consecutive hours, the mean daily temperature on November 4 being $9^{\circ}.7$ higher on Ben Nevis than at Fort William.

The Ben Nevis observations, of course, afford a comparison only between the conditions at the summit and those at the base of the mountain. It is more than probable that on many occasions when the summit temperature becomes nearly, though not quite, as high as that at the base, there is an inversion of temperature in part of the air-column between the summit and sea-level.

ANDREW WATT.

Scottish Meteorological Society, Edinburgh, April 12.

Stanton Drew.

THE mysteries of this group of circles—the next in importance to those of Avebury and Stonehenge—are not yet fully unveiled, even by the very remarkable astronomical discoveries made in them by Sir Norman Lockyer or by his interesting description of them.

The diameter of the north-east circle is 97 English feet, or 100 of an old Mediterranean foot of 11.64 inches. This is within an inch or two of the diameter of the outer sarsen ring at Stonehenge, which is in itself a very significant fact. The diameters of the south-western and central circles are respectively 150 and 380 of this old foot, so that the diameters of the circles (within a very slight working error) are in proportion one to the other of 5, $7\frac{1}{2}$, and 19, the latter being the Metonic cycle number.

The distances between the various parts of the group, subject to a working error of from $\frac{1}{2}$ to $\frac{3}{4}$ of 1 per cent. only, are:—

Centre of cove through great circle to centre of north-east circle = 14 diameters of north-east circle.

Centre of great circle to Hauteville's Quoit = 5 diameters of the great circle, or 19 diameters of the north-east circle, the latter being the Metonic cycle number.

Centre of south-west circle through great circle to Hauteville's Quoit = 7 diameters of the great circle.

Centre of great circle to two stones too far to the west to be shown on the plan in NATURE = 9 diameters of the great circle.

With the exception of the last, anyone can test these proportionate distances by the plan given in NATURE, but who will tell us what was the meaning or object of them?

A. L. LEWIS.

ALCOHOL IN INDUSTRY.

THE committee, consisting of Sir Henry Primrose, K.C.B. (chairman), Sir W. Holland, M.P., Mr. J. Scott-Montagu, M.P., Sir William Crookes, Mr. Lothian Nicholson, Dr. Somerville, of the Board of Agriculture, Dr. Thorpe, the director of the Government Laboratories, and Mr. Thomas Tyrer, appointed last autumn by the Chancellor of the Exchequer to inquire into the use of duty-free alcohol in the arts and manufactures have got together their evidence and published their report with commendable promptitude. The report, we are glad to find, is unanimous, and this unanimity has doubtless not been without its influence in accelerating the business of the committee and the appearance of their report.

The subject, as was to be anticipated, has not been without its difficulties, for, as the committee state, a duty that yields more than twenty millions a year is a public interest that cannot be trifled with; but, as usual when men are determined to find a solution, it is remarkable how purely academic difficulties tend to disappear. Now that the suggestions of the committee are before us, the wonder is that they should not have been given effect to a quarter of a century

ago. We are afraid the delay does not reflect creditably upon the enterprise, energy, or constructive ability of the numerous groups of manufacturers who are interested in obtaining the greatest possible facilities in the use of duty-free alcohol in the arts. This attitude of *laissez-faire* is seen, and commented upon by the committee, in connection with the apathy and general ignorance of manufacturers with respect to the provisions of Section 8 of the Finance Act of 1902, which gave the commissioners of Inland Revenue large discretionary powers as regards the use of spirit for industrial purposes. The committee point out that advantage has not been taken of the Act to the extent that might have been anticipated, and they have been surprised to find in examining the witnesses sent by the various Chambers of Commerce, who certainly ought to have had official knowledge of its existence, how very inadequate has been their acquaintance with its provisions.

In view of this general indifference one is tempted to inquire whether the manufacturers have had any real grievance, since they have made so little individual or collective effort to remove it. There is certainly no evidence that any collective effort has been made in the past, or, if it had been made, that the Treasury or the Revenue authorities would not have sympathised with it. The Exchequer, at all events since 1855, when the present system of denaturing spirit came into existence, may be said to have disclaimed any idea of collecting a revenue on alcohol used solely as a raw material and for purely industrial purposes. If the hitherto existing system of denaturing and control had proved so irksome that the development of chemical industry was impossible, it might have been supposed that Parliament would have been troubled with the question long ago. But as an actual fact the languid interest of the chemical manufacturers needed, apparently, to be supplemented by the quickening influence of the internal-combustion engine, and the possible applications of spirit as a motor-fuel supplied to a jaded House of Commons engaged in the discussion of a Finance Bill that stimulus which was necessary to secure from the Chancellor the promise of the departmental inquiry, which it would seem the great body of manufacturing chemists was too lukewarm to ask for.

Great cry has been made in the past that the hindrances to a free and untrammelled supply of alcohol have cost us the coal-tar dye industry, which originated in this country, and at one time flourished here; but the committee apparently have had little difficulty in ascertaining how "little wool" there is in this cry. They say they are satisfied that the assertion, as a statement of historical fact, is destitute of substantial foundation. In their opinion the main cause which led to the decadence of the industry in this country is that which we have repeatedly insisted on in these columns, viz. the failure of those responsible for the management and for the finance of the industry here during the years 1860-1880 to realise the vital importance of its scientific side, and their consequent omission to provide adequately for its development on that side.

It is true, however, that after signing the report, the two Members of Parliament named were induced to modify their assent to the unanimous finding of the committee as to the real cause of the decline of the coal-tar dye industry in this country. It will be interesting to see from the evidence, when this is published, what support Sir William Holland and Mr. John Scott-Montagu are able to find for the view they express in their letter to the Chancellor.

In reality, "alcohol" plays a very small part in

that industry, and of this "alcohol" methyl alcohol is the most important variety. Large classes of the coal-tar colours—alizarin, indigo, and by far the greater number of the azo dyes—require no spirit at all in their manufacture either directly or indirectly, and these represent the larger proportion of all the colours produced. It is perfectly certain that for at least 75 per cent. of the whole output of coal-tar dyes alcohol does not enter into account even now, and therefore whatever causes may have hindered the prosecution of the industry in this country, the question of "alcohol" is not one of them.

Although it has destroyed some illusions, corrected many misstatements, and, as in this example of the coal-tar colour industry, set many matters in their true perspective, the report is eminently constructive in character. To what extent the representations of manufacturers have actually aided the committee in formulating their main suggestions remains to be seen, as the evidence has not yet been published.

These recommendations are as follows:—

(1) That an allowance be granted to all industrial spirit, whether of British or foreign origin, at the rate from time to time prevailing for the allowance to British plain spirits on exportation.

(2) That imported methylic alcohol be relieved from the obligation to pay the surtax imposed by the proviso to Section 8 of the Finance Act, 1902, and that methylic alcohol be accorded favourable treatment in the matter of denaturing.

(3) That "ordinary," i.e. unmineralised, methylated spirit should contain only 5 per cent. of wood-naphtha instead of 10 per cent. as now.

(4) That no charge should be made on manufacturers for the regular attendance of Excise officers to supervise denaturing operations or the use of denatured spirit, in factories taking the benefit of Section 8 of the Finance Act, 1902.

(5) That where spirit is allowed to be denatured with special agents, such agents should be subject to official test and approved, and that accounts should be kept by the user showing receipts of spirit into store, the issues thereof from store in detail, and the quantities of the goods produced.

(6) That in the manufacture of fine chemicals and pharmaceutical products, spirit specially denatured should be allowed only where the manufacture is kept entirely separate from the manufacture of tinctures and other preparations in which spirit remains as spirit in the finished product.

(7) That the regulations governing the sale by retail of "mineralised" methylated spirit should be made less stringent and more elastic.

The committee are of opinion that any special cases not touched by the above recommendations can always be met under the powers conferred by Section 8 of the Act of 1902. This Act provides adequate and entirely satisfactory machinery for securing that the spirit may be used in a condition that is suitable and appropriate to each particular purpose of manufacture. The machinery is elastic—much more so than is the corresponding machinery in Germany—and it permits of every reasonable process of denaturing, or even in the last resort of the use of spirit in a pure state. For more than this it would be impossible to ask.

The committee believe that their recommendations, if adopted, will place the manufacturers of this country in respect of the use of alcohol in industry on a footing of equality, in some respects of advantage, as compared with their competitors abroad. Amongst the witnesses who appeared before them they found a very general impression that in Germany, at any rate—and Germany is always alleged to be our most

formidable competitor—spirit could be used in manufacture duty-free and pure with scarcely any restraint. This, too, is one of the illusions which the inquiry may serve to dispel. As an actual fact, in practically all cases, with the exception of that of smokeless powder, in Germany duty-paid spirit must be used unless the spirit be subjected to some authorised process of denaturing prior to use. As regards price, and that is the principal factor, the committee think that the grant of the export allowance would make the average price of industrial spirit in the United Kingdom even lower than the average price in Germany. The price here, exclusive of the cost of any denaturing, and this denaturing may be what is called *ad hoc*—that is, dependent upon the use of something which is necessary to the manufacture—would be about 7d. the *proof* gallon, or about 11½d. the bulk gallon at 64 over proof—the strength common in industrial spirit. That is as low as the minimum price paid by users in Germany in 1902, when spirit was abnormally cheap, and is much below the figures of 15½d. per proof gallon, or 25½d. per bulk gallon, prevailing in Germany at the present time. Further, it is important to remember that the price of spirit in this country, where all materials may be freely used, and where none of general use is subject to taxation, is a stable price. In Germany the conditions of production are largely artificial and of very doubtful economic soundness, and they tend to wide and rapid fluctuations in price.

The main report is supplemented by a valuable report by the chairman, Sir Henry Primrose, and Dr. Thorpe, the principal of the Government Laboratories, on the working of the spirit regulations in Germany, based upon personal inquiry and observation in that country. So much stress was laid by certain witnesses upon the system and regulations established in Germany in connection with the industrial use of alcohol that it was thought very desirable to procure information at first hand upon that subject. This report may, it is hoped, serve to correct much misapprehension which appears to exist upon the benefits of State-aided alcohol in Germany. There is ample proof that the German user of spirit is not greatly benefited by the policy which the agrarian party has succeeded in fixing upon him, and is, indeed, at times greatly injured by it.

In reply to a question asked in the House of Commons on Tuesday, the Chancellor of the Exchequer announced that he has decided to deal with the subject of the committee's report in an omnibus Bill which he will introduce to the House, and not in the Budget and Finance Bill as originally proposed.

THE CAPITAL OF TIBET.¹

ALL who have read in the columns of the *Times* about the mission to Lhasa will welcome in a more concrete form the story as re-told by Mr. Landon in the two handsome volumes now given to the public. In an expedition carried out under such conditions as those which governed Colonel Younghusband's mission, the special correspondent becomes a distinct factor in its success. The working men of the party, even if they have eyes to see and the rare gift of recording their impressions faithfully, can but present such generalisations as may be gathered during the few intervals hastily snatched from the worries and anxieties incidental to the routine of an abnormal state of existence. Usually they see but little, and that little from the restricted standpoint of their own idiosyncrasies.

¹ "Lhasa; an Account of the Country and People of Central Tibet, &c." By Percival Landon. Vol. i. Pp. xix+414. Vol. ii. Pp. xi+426. (London: Hurst and Blackett, 1905.) Price 42s. net.